10 Measures

to accelerate the market ramp-up of Sustainable Aviation Fuel (SAF)



Work results of the SAF working group as part of the "Climate-neutral aviation" working group, initiated by BMDV/BMWK

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In November 2022, the "Climate-neutral aviation" working group was set up by the Federal Ministry for Economic Affairs and Climate Protection (BMWK) and the Federal Ministry for Digital and Transport Affairs (BMDV). In three sub working groups with stakeholders from industry, science and civil society, the working group has set itself the aim of developing concrete measures that contribute to achieving the climate targets in aviation.

In the SAF working group (AG SAF), more than 70 stakeholders have analyzed challenges and developed measures for a rapid market ramp-up of renewable aviation fuels (SAF) in various workshops and working sessions. This 10-point package of measures summarizes the results of the work of AG SAF to date and outlines the next steps required.

Measure 1:

Rapid establishment of the announced Interministerial Steering Group on Renewable Fuels (ISEK)

The successful work of the AG SAF was also a result of the good cooperation with the federal government departments involved. The close exchange of information with the working level advisors on both technical and political issues has significantly advanced the joint work. At the same time, it has also become clear that many open issues can only be resolved through cooperation between the various departments. Thus, the establishment of the announced Interministerial Steering Group on Renewable Fuels (Interministeriellen Steuerungsgruppe Erneuerbare Kraftstoffe, ISEK), in particular with the participation of BMWK, BMDV, The Federal Ministry for the Environment and Consumer Protection (BMUV) and the Federal Ministry of Finance (BMF), represents an important step towards stronger coordination within the Federal Government.

In addition, there are still major legal uncertainties, particularly in the implementation of European legal acts. In the context of the implementation of the ReFuelEU Aviation Regulation, for example, there are many questions regarding the interpretation and further development of regulations that can be addressed more quickly by an ISEK, such as the further development of the European SAF flexibilization mechanism or the revision of the regulation in 2027. Overall, the steering group can make a decisive contribution to quickly clarifying implementation issues and thus creating legal and planning certainty. The ISEK would also be a suitable interface for future cooperation between the ministries and the SAF working group.

Measure 2:

Continuation of the AG SAF under the patronage of the Federal Government

The high level of commitment shown by all members of the SAF working group clearly demonstrated that there is great interest in continuing the successful work of the SAF working group. In addition to a detailed potential analysis of the production volumes planned for SAF worldwide, some open questions were also clarified. In addition, the SAF working group can also act as a proven advisory body for the ministries. The commitment of the federal government is crucial for successful cooperation. In particular, the BMDV, BMWK and BMUV should actively participate in the dialog with the SAF working group. The fact that the Climate Neutral Aviation Working Group (AKkL) has been able to develop a large number of proposals in all three working groups to date and at the same time address many open questions, results also from the leadership of the AKkL by the BMDV and BMWK. The continuation of the AKkL and the SAF working group should therefore continue under the patronage of the ministries. The SAF working group believes that the BMUV must be equally involved.



Measure 3:
Avoid distortions of competition and carbon leakage

A blending obligation for SAF limited to European airports would lead to considerable competitive disadvantages for airlines based in the EU due to the significantly higher price of SAF. Passenger flows on flights to Asia, Africa and Australia would therefore shift significantly more from EU hubs to non-EU hubs where no blending obligations exist. The result would be a loss of economic value added in the EU and carbon leakage. To prevent this, the price gap between SAF and fossil fuels needs to be evened out. The introduction of a final destination-related and earmarked charge based on the aviation tax or comparable measures could ensure this by distributing additional costs for SAF to all market participants in line with the final destination.

Measure 4:
Create investment incentives for E-SAF production

As part of a global inventory (existing, under construction and planned production facilities), an analysis of current and forecast SAF production volumes up to 2030 was carried out. It was shown which processes are used in SAF production, in which cases they are used, and how the development status (degree of hardness) of the respective projects is to be assessed. This is done against the background of examining whether the announced production capacities can meet the quotas at national and EU level.

The CENA SAF Outlook 2024 - 2030, prepared in collaboration with the SAF Working Group, has shown that SAF projects worldwide are primarily being developed as projects for the production of biogenic SAF, while the technological focus in Germany is clearly on E-SAF (kerosene produced from renewable electricity using the PtL process): 18 out of 20 SAF projects in Germany are E-SAF projects. However, most of these are still in the planning or project idea stage. Only six plants are under construction or in operation as research and demonstration plants. Fulfilling the European SAF quota with biogenic processes appears to be possible based on the announced projects and taking into account the Technology Readiness Level. Taking into account the current framework conditions, it seems unlikely that the national PtL quota will be met, especially in 2026 and 2028. However, there is also a need for action to ensure fulfillment of the European E-SAF quota, which takes effect in 2030. The analysis of announced production projects clearly shows that, in addition to the current quota-based regulatory environment, further measures are needed to stimulate the market ramp-up of E-SAF production.

The participants in the SAF working group have therefore identified three key measures to support the market ramp-up of E-SAF.



Due to the expected cost degression in the E-SAF production and technical challenges, first-generation E-SAF projects are associated with high risks. A long-term purchase agreement for the products is usually a prerequisite for realization. However, market participants such as airlines lack the financing options and incentives to conclude such a contract. As a measure, the SAF working group recommends long-term oriented public tenders for E-SAF, which are financed by a distance-based, earmarked charge similar to the German air traffic tax. In the coming months, the SAF WG will work out possible implementation models in more detail.

In addition, de-risking instruments should facilitate the access of private capital to E-SAF projects. These include the provision of low-interest subordinated loans by the KfW or other measures in coordination with the industry, such as public-private partnerships in SAF production or other guarantees for off-take agreements that help to increase the "bankability" of off-take agreements. Targeted cooperation between the public sector and the financial sector with the aim of reducing barriers to investment must also be further promoted.

In addition to E-SAF, raw materials for E-SAF production, including e-methanol and Fischer-Tropsch crude, can be produced cheaply at locations around the world with particularly good conditions for renewable electricity from sun and wind and transported to Germany for further processing. The creation of an international market for these products enables the cost-efficient provision of E-SAF. As a measure, the SAF working group recommends advocating internationally uniform standards and energy partnerships for the import of these products.

In addition to renewable electricity, the production of E-SAF also requires CO_2, which will have to be extracted from the atmosphere in the future. The SAF working group recommends to further develop existing regulations and to work towards globally uniform rules on the use of CO_2. Some participants in the SAF working group see a need for action, particularly with regard to the international use of industrial sources, as current EU legislation leaves questions unanswered in this regard. In addition, the further development of technologies for the direct extraction of CO_2 from the atmosphere (DAC) should be accelerated by

suitable instruments because these must be available in good time and in sufficient quantities as part of the ambitious market ramp-up of E-SAF.

In addition to financing challenges, the regulatory and political framework conditions are also a major risk for first E-SAF projects. Particularly in the learning phase of the market ramp-up, (technical) requirements for E-SAF production, such as the supply with renewable electricity or the purchase of CO_2, are being further developed. Plants that do not (or no longer) meet these changed requirements could then no longer be operated economically well before the planned operating period. With a typical operating period of a plant of 20 years or more, this represents an incalculable risk. The SAF working group therefore recommends that the framework conditions for the first projects be established over a period of 15-20 years with the help of grandfathering measures.

Measure 5:
Preparation of an official guide for obligated companies and potential investors

The scope and complexity of the regulations and subsidies are very challenging or even daunting for industry players and investors. There are also numerous legal ambiguities and restrictive conditions, for example regarding the use of raw materials, production processes or crediting methods. We therefore propose that the German government draw up official guidelines. In order for this to succeed, the German government should also work towards for further clarification at European level.

A large number of open questions have already been addressed in cooperation with the ministries involved. With this in mind, the BMUV and BMDV are preparing a joint Q&A document. This can serve as the basis for a comprehensive guideline.

Measure 6:
SAF production as an industrial policy instrument

In view of the central role that renewable fuels play in the defossilization of the economy as a whole, Germany should continue to strive to play a pioneering role in the development and scaling of the new economic sector surrounding the production of E-SAF. For this purpose, it must be ensured that the relevant key industries also locate in Germany.

Successful breakthrough projects can only be acchieved through a combination of legal and planning certainty and further development of the funding framework. Not only pilot and research projects, but also large-scale projects on an industrial scale must be promoted in order to supplement SAF quotas and ensure their fulfillment. From an industrial policy perspective, break-through projects can contribute to further developing the necessary future technologies in Germany and expand the corresponding know-how and create new jobs in Germany. Germany's technological pioneering role in the field of green hydrogen and PtL technologies can only be preserved in the long term if knowledge and expertise are applied to concrete business models. Break-through projects form the basis for this. In addition, other technologies that will play an important role in SAF production in the long term, such as Direct Air Capture (DAC), can be developed to market readiness.

Measure 7:
Pooling research on SAF and transferring it into practice

The SAF working group has identified several relevant research areas for the successful market ramp-up and efficient use of SAF. The AG SAF recommends supporting these topics with suitable resources and creating platforms or continuing them within the AG SAF and enabling the bundling and rapid implementation of findings in practice.

In a kick-off workshop, interested stakeholders of the SAF working group discussed the connection between kerosene composition and climate impact. The participants would like to continue this initiative and investigate the opportunities and implementation aspects of a changed kerosene composition, for example with reduced aromatics and sulphur content, in more detail. There is a need for further research into the potential and implementation aspects of targeted refueling with SAF to reduce non-CO_2 effects.

Another important aspect in connection with the introduction of SAF is the fuel logistics and refueling infrastructure at airports. The AG SAF sees a need for further investigation into the blending options and nationwide supply of all EU airports with increasing proportions of SAF in accordance with the requirements of ReFuelEU Aviation.



Measure 8:
Simplification and acceleration of the SAF ramp-up through book & claim systems

A further development of the SAF flexibilization mechanism, as envisaged in ReFuelEU Aviation, towards a book and claim crediting mechanism can help to accelerate the SAF market ramp-up in the short and medium term. The following objectives should be pursued:

- Pragmatic design and rapid implementation so that the SAF ramp-up is accelerated in the short and medium term and not slowed down. In the long term, SAF must be available at all airports.
- High compliance standards (fraud prevention, transparency, protection against double counting).
- Implementation of regular reviews of corresponding instruments in order to be able to react flexibly to market and technological developments.
- Simplification of SAF logistics, especially for small SAF quantities at the start of the market ramp-up.
- Creation of incentives and opportunities for voluntary overfulfillment of blending quotas by accounting for the corresponding SAF quantities in the EU ETS and when SAF use is targeted to avoid non-CO_2 effects.
- Harmonized and simplified verification of the use of SAF in all (regulatory) instruments (e.g. SAF quota, EU ETS, voluntary reporting).
- In addition, political initiatives should be launched to ensure that compatible mechanisms are also introduced at global level.

Based on these points, some participants of the AG SAF have developed a white paper ("Book-and-Claim for Sustainable Aviation Fuel") for the more specific design of a book and claim mechanism, which can be viewed in the appendix to this package of measures.

Measure 9:
Strategic development of the use of biogenic raw materials

SAF from biogenic raw materials will play an important role, especially in the coming years, as E-SAF will not be available on a large scale until post 2030. However, the type and extent of the use of biogenic raw materials is subject to a consideration of sustainability, social and economic aspects. There are different views on this within the SAF working group. A strategic directional decision on this must be taken at a political level and implemented consistently.

Inconsistent, unclear or sometimes contradictory regulations and complex administration at national and EU level were identified by the SAF working group as barriers to the sustainable further development of the use of biogenic raw materials. The SAF working group also sees a need for development in certification systems and testing mechanisms to ensure the use of biogenic raw materials in a reliable and transparent manner. Only if these conditions are met can market participants make long-term investments in the sustainable sourcing of raw materials and in innovative processes to produce SAF with biogenic raw materials. Innovative conversion processes that make extensively available raw materials accessible for SAF production, as well as synergetic processes for the coupled conversion of green hydrogen and biomass, should be brought to market readiness in a target-oriented manner.

Measure 10:
Investor conference on the initiative of the German government

As part of an international investor conference under the patronage of the German government, relevant stakeholders can be brought into a strategic dialog with the financial sector. The aim should be to mobilize capital for investments in production facilities in Germany.


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